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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/588,115	05/31/2000	Jueng Gil Lee	CDST-C130-1P	7774
7590 12/24/2003 Wagner Murabito & Hao LLP Two North Market Street Third Floor San Jose, CA 95113			EXAMINER ROY, SIKHA	
			ART UNIT 2879	PAPER NUMBER

DATE MAILED: 12/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/588,115

Applicant(s)

LEE ET AL.

Examiner

Sikha Roy

Art Unit

2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 20-24 and 47-54 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 20-24 and 47-54 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

The Response, filed on October 15, 2003 has been entered and is acknowledged by the Examiner.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 20- 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent 5,894,188 to Chakvorty et al. in view of U.S. Patent 6,320,138 to Kamiya et al.

Regarding claim 20, Chakvorty et al. disclose (column 3 lines 6-15, column 5 lines 40-62, Fig. 1C)) an electrode (cathodic) structure for a flat panel display comprising a metallic layer (aluminum strip) 103 over which a protective layer (cladding layer) 104 is deposited. Mask and etch steps are performed to form the electrode (column 6 lines 8,9 step 213, Fig 2).

Claim 20 differs from Chakvorty et al. in that Chakvorty et al. do not exemplify the metal alloy layer including neodymium having a concentration of between greater than three and six atomic percent in the structure of multi-layer electrode.

Kamiya in relevant art of conductor formed of low resistance aluminum alloy discloses (column 6 lines 24-30 Figs. 7-9) that it is preferable to set the concentration of Nd at about 4 atomic percent in the Al-Nd alloy thin film of the conductor. Kamiya further discloses that with this concentration of greater than 3 atomic percent of

neodymium the specific resistance of the alloy is low and also the occurrence of hillocks and pinholes can be suppressed.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to modify the metal layer of the electrode structure of Chakvorty et al. by the metal alloy layer as taught by Kamiya for low electrical resistance and fewer occurrences of defects such as hillocks in the multi-layer electrode.

Regarding claim 21, Chakvorty and Kamiya disclose Al alloy produced by mixing Nd (neodymium) with aluminum in an amount of up to 4 atomic percent.

Regarding claim 23, Chakvorty et al. disclose (column 8 lines 19-26) that the refractory metals molybdenum and tungsten which are easy to process, do not interdiffuse with aluminum and make good electrical contact with aluminum conductors and the overlying layers are used as protective (cladding) layer.

Regarding claims 22 and 24 Chakvorty et al. and Kamiya disclose the claimed invention except for the limitations of thickness of the metal alloy layer and the protective layer to be approximately 2500°A and 1200°A respectively. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. Thus, it would have been obvious to one of ordinary skills in the art at the time the invention was made to provide the values of the thickness of the metal alloy layer and protective layer, since discovering an optimum value of a result variable is considered within the skills of the art.

Claims 47-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent 5,894,188 to Chakvorty et al. and U.S. Patent 6,320,138 to Kamiya et al. and further in view of EP 731507 A1 to Takayama.

Referring to claim 47, Chakvorty et al. in view of Kamiya disclose electrode structure for a flat panel display, the electrode comprising Al-Nd alloy layer including neodymium in an amount of 4 atomic percent, a protective (cladding) layer deposited on the metal alloy layer formed by mask and etch steps.

Claim 47 differs from Chakvorty and Kamiya in that Chakvorty and Kamiya do not disclose the barrier layer disposed above the metal alloy layer in the multi layer electrode.

Takayama in analogous art of electrode material discloses (page 4 lines 35,36) a barrier layer formed by anodically oxidizing the metal-alloy conductor line. It is noted that the anodically oxidized conductor has high dielectric strength and excellent insulating characteristic.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include the barrier layer of Takayama on the metal alloy layer of Chakvorty and Kamiya for obtaining a conductor line layer with high dielectric strength and excellent insulating characteristic.

Claim 48 essentially recites the same limitation as of claim 21 and hence is rejected for the same reason.

Regarding claim 50, Takayama disclose (page 4 lines 35,36) a barrier layer formed by anodically oxidizing the metal-alloy conductor line. It is noted that the anodically oxidized conductor has high dielectric strength and excellent insulating characteristic.

Claim 52 essentially recites the same limitation as of claim 23 and hence is rejected for the same reason.

Regarding claims 49,51 and 53 Chakvorty et al., Kamiya et al. and Takayama disclose the claimed invention except for the limitations of thickness of the metal alloy layer, barrier layer and the protective layer to be approximately 2500°A, 100°A and 1200°A respectively. Takayama discloses (page 4 line47) Al alloy thin layer together with anodically oxidized film having a thickness of 4000°A or less. The total thickness of the multi-layer electrode as claimed in 49,51 and 53 is approximately 3800°A. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980). Thus, it would have been obvious to one of ordinary skills in the art at the time the invention was made to provide the values of the thickness of the metal alloy layer and protective layer, since discovering an optimum value of a result variable is considered within the skills of the art.

Regarding claim 54, the Examiner notes that the claim limitation that “the multi-layer electrode is etched using a wet etchant with volume percentages of constituents of approximately 70-80 percent  $\text{H}_3\text{PO}_4$ ; approximately 10-15 percent  $\text{HNO}_3$ ; approximately 7-12 percent  $\text{CH}_3\text{COOH}$  and approximately 2-8 percent  $\text{H}_2\text{O}$  to form desired sloped

profile “ is drawn to a process of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation is not afforded patentable weight (see MPEP 2113). Therefore, it is the position of the examiner that it would have been obvious to one of ordinary skill in the art that the multi-layer electrode disclosed by Chakvorty et al., Kamiya et al. and Takayama is at least a fully functional equivalent to the Applicant's claimed multi layer electrode as evidenced by claim 54.

### ***Response to Arguments***

Applicant's arguments filed October 15, 2003 regarding claims 20 and 47 have been fully considered but they are not persuasive.

In response to applicants' argument that Chakvorty and Kamiya narrow the description of the setting of Al-Nd thin film to about 4 atomic percent at heat treatment temperature of 250 °C, the Examiner respectfully disagrees. The examiner notes that Kamiya indeed discloses (column 3 lines 6-13) the Nd concentration in the thin film wiring substrate is 2-4 atomic percent having specific resistance considerably reduced at 10 $\mu\Omega$ cm and good anti-pinhole characteristic. Kamiya discloses (column 3 lines 50-64) that at the heat treatment temperature of 250 °C, setting Nd concentration at 4 atomic percent or more increases the specific resistance. Claims 20 and 47 do not

recite any limitation relating to temperature and specific resistance. Furthermore the specification does not disclose any dependence of Nd concentration on temperature and specific resistance of the metal alloy. Hence in response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., concentration of Nd in metal alloy layer between greater than three atomic percent and 6 atomic percent at all temperatures) are not recited in the rejected claim(s).

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent 5,514,909 to Yamamoto et al. discloses electrode structure made of aluminum alloy consisting of aluminum and Nd when the content of Nd (rare earth element) is 4 atomic percent or less.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of



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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

**Contact Information**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sikha Roy whose telephone number is (703) 308-2826. The examiner can normally be reached on Monday-Friday 8:00 a.m. – 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar D. Patel can be reached on (703) 305-4794. The fax phone number for the organization is (703) 308-7382.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

S.R.

Sikha Roy  
Patent Examiner  
Art Unit 2879



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